FORM PTO-1390 (Modified) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE (REV 11-2000)	ATTORNEY'S DOCKET NUMBER
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371	32527

TRANSMITTAL LETTER TO THE UNITED STATES

DESIGNATED/ELECTED OFFICE (DO/EO/US)

CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

10/070401

INTERNATIONAL APPLICATION NO. **PCT/SE00/01674**	INTERNATIONAL FILING DATE **31 August 2000**	PRIORITY DATE CLAIMED **3 September 1999**

TITLE OF INVENTION

GRAPHICAL USER INTERFACE AND METHOD RELATED THERETO
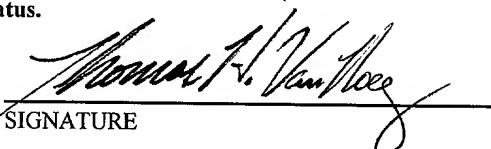
APPLICANT(S) FOR DO/EO/US

RUDA, Fredrik

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.

2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.

3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.

4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).

5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))

    a. ☒ is attached hereto (required only if not communicated by the International Bureau).

    b. ☐ has been communicated by the International Bureau.

    c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).

6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).

    a. ☐ is attached hereto.

    b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).

7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))

    a. ☐ are attached hereto (required only if not communicated by the International Bureau).

    b. ☐ have been communicated by the International Bureau.

    c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.

    d. ☐ have not been made and will not be made.

8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).

10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409). `With Annexes`

12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.

14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.

15. ☒ A **FIRST** preliminary amendment.

16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.

17. ☐ A substitute specification.

18. ☐ A change of power of attorney and/or address letter.

19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.

20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).

21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).

22. ☒ Certificate of Mailing by Express Mail

23. ☐ Other items or information:

     PCTUS1/REV03

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR` **10/070401**	INTERNATIONAL APPLICATION NO. PCT/SE00/01674	ATTORNEY'S DOCKET NUMBER 32527

24.   The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

CALCULATIONS   PTO USE ONLY

☒   Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1040.00**

☐   International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$890.00**

☐   International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$740.00**

☐   International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$710.00**

☐   International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**

ENTER APPROPRIATE BASIC FEE AMOUNT =   **$1,040.00**

Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20   ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).   **$0.00**

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	18 - 20 =	0	x $18.00	$0.00	
Independent claims	2 - 3 =	0	x $84.00	$0.00	
Multiple Dependent Claims **(check if applicable)**			☐	$0.00	

TOTAL OF ABOVE CALCULATIONS   =   **$1,040.00**

☐   Applicant claims small entity status. See 37 CFR 1.27). The fees indicated above are reduced by 1/2.   **$0.00**

SUBTOTAL =   **$1,040.00**

Processing fee of **$130.00** for furnishing the English translation later than ☐ 20   ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).   +   **$0.00**

TOTAL NATIONAL FEE =   **$1,040.00**

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).**   ☒   **$40.00**

TOTAL FEES ENCLOSED =   **$1,080.00**

	Amount to be: refunded	$
	charged	$

a. ☒   A check in the amount of   **$1,080.00**   to cover the above fees is enclosed.

b. ☐   Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒   The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No.   **19-0522**   A duplicate copy of this sheet is enclosed.

d. ☐   Fees are to be charged to a credit card. **WARNING: Information on this form may become public. Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Thomas H. Van Hoozer, Reg. No. 32,761
HOVEY WILLIAMS LLP
2405 Grand Boulevard, Suite 400
Kansas City, MO 64108

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PATENT TRADEMARK OFFICE

Thomas H. Van Hoozer

SIGNATURE

Thomas H. Van Hoozer

NAME

32,761

REGISTRATION NUMBER

March 1, 2002

DATE

<u>IN THE UNITED STATES PATENT AND TRADEMARK OFFICE</u>

Application of:

Fredrik RUDA

U.S. National Phase Application of
International Application Serial No. :
PCT/SE00/01674

International Filing Date: 31 August 2000

GRAPHICAL USER INTERFACE AND
METHOD RELATED THERETO

Assistant Commissioner of Patents
Box PCT
Washington, D.C. 20231

Sir:

PRELIMINARY AMENDMENT

Please enter the following preliminary amendment prior to examination of this

application on the merits and computation of the fees:

ABSTRACT

Applicant submits herewith an abstract of the invention retyped on a separate page

in conformance with U.S. practice. The abstract is taken from that appearing on the cover of the

published international application.

CLAIMS

Please amend the claims to read as follows:

1.   (Amended) A graphical user interface for monitoring and/or controlling a computer controlled dairy farm system or part thereof by a human user, said graphical user interface comprising a computer based graphical and schematic representation of said dairy farm system or part thereof, wherein said representation comprises objects, each of which represents a respective part of said dairy farm system, or part thereof, and each having a spatial location in relation to the other object(s), wherein said spatial location in relation to other object(s) of the respective object is mapped to the spatial location of the respective represented part of said dairy farm system or part thereof.

2.   (Amended) The graphical user interface as claimed in claim 1, wherein

–   each of said objects has at least one associated physical property, wherein each said at least one physical property associated with the respective object is comprised among physical properties of the respective represented part of said dairy from system or part thereof; and

–   each said at least one physical property which is comprised among the properties of the respective represented part of said dairy farm system or part thereof, is chosen from the group of size, shape, color, direction, movement, amount, rate, and frequency.

3.   (Amended) The graphical user interface as claimed in claim 1, wherein said graphical user interface comprises a schematic representation of an entire dairy farm system, in which case said graphical user interface comprises objects representing parts such as each individual cow, fence, gate or apparatus in the dairy farm system.

4.   (Amended) The graphical user interface as claimed in claim 3, wherein said graphical user interface comprises schematic status indications for at least one of said objects such as for instance if a cow has been milked or not, if a gate is opened or closed, or if an apparatus is in use or not.

5.   (Amended) The graphical user interface as claimed in claim 1, wherein said graphical user interface comprises a schematic representation of milking machine or part thereof, or of a cow or part thereof.

6.   (Amended) The graphical user interface as claim in claim 5, wherein said graphical user interface comprises schematic representations of the teats of a cow, or teat cups that are attached to them, by four icons located schematically with a longer distance between the icons representing the front teats or teat cups and a shorter distance between the icons representing the back teats or teats cups.

7.   (Amended) The graphical user interface as claimed in claim 6, wherein the schematic representations of the teats or teat cups are associated with respective controls for starting milking or with respective status indications indicating milk yield during milking.

8.   (Amended) The graphical user interface as claimed in claim 6, wherein said graphical user interface comprises schematic representations of the teat cups as detached at spatial locations, which schematically correspond to the respective spatial locations in the milking machine.

9.   (Amended) The graphical user interface as claimed in claim 8, wherein each of the four icons schematically representing the teats of a cow, or teat cups that are attached to them, has a visual characteristic in common with the respective associated schematic representation of the teat cup as detached, in order to map each detached teat cup to its respective attached position.

10.   (Amended) The graphical user interface as claimed in claim 5, wherein said graphical user interface comprises schematic representations of an entry gate and of an exit gate, respectively, of said milking machine, at spatial locations corresponding schematically to the respective locations in the milking machine.

11.   (Amended) The graphical user interface as claimed in claim 10, wherein the schematic representations of the entry gate and of the exit gate are associated with respective controls for opening and closing the respective gate or with respective status indications indicating whether the respective gate is opened or closed.

12.   (Amended) The graphical user interface as claimed in claim 6, wherein said graphical user interface comprises schematic representations of a rear plate and of a manger, respectively, of said milking machine.

13.   (Amended) The graphical user interface as claimed in claim 12, wherein the schematic representations of the rear plate and of the manger are associated with respective controls for positioning the rear plate and the manger or with respective status indications indicating the location of the rear plate and the manger.

14.   (Amended) An automatic milking machine comprising a graphical user interface as claimed in claim 1.

15.   (Amended) A method for providing a graphical user interface for the monitoring and/or controlling of a computer controlled dairy farm system or part thereof, by a human user, comprising the step of:

–   displaying a computer based graphical and schematic representation of said dairy farm system or part thereof, where said representation comprises

-4-

objects, each of which represents a respective part of said dairy farm system or part thereof, and each having a spatial location in relation to the other object(s) of the respective object is mapped to the spatial location of the respective represented part of said dairy farm system or part thereof.

17.   (Amended) The method as claimed in claim 15, further comprising the step of displaying a schematic representation of a milking machine or part thereof, or of a cow or part thereof.

18.   (Amended) The method as claimed in claim 17, further comprising the step of displaying schematic representations of the teats of a cow, or teat cups that are attached to them by four icons located schematically with a longer distance between the icons representing the front teats or teat cups and a shorter distance between the icons representing the back teats or teat cups.

REMARKS

Applicant submits herewith a Preliminary Amendment for entry prior to computation of the fee and examination of the application on the merits. Claims 1-5 and 17-18 have been amended; claim 16 has not been amended. Applicant believes the amendment submitted herewith conforms the application to U.S. practice and it is believed that the amendments to the claims place them in allowable form. In view of the favorable International Preliminary Examination Report, early issuance of the Notice of Allowance is courteously requested. Should the examiner have any questions which may be resolved by telephone conference, it is requested that the examiner contact applicant's attorney at 1-800-445-3460.
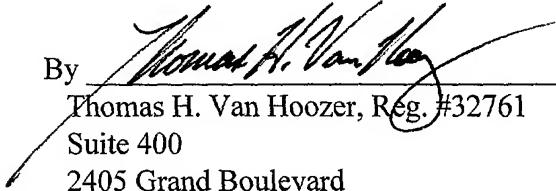
Should this amendment necessitate any additional fees it may be charged to Deposit Account No. 19-0522.

Respectfully submitted,

HOVEY WILLIAMS LLP

By _____

Thomas H. Van Hoozer, Reg. #32761
Suite 400
2405 Grand Boulevard
Kansas City, Missouri 64108
(816) 474-9050

(Docket No. 32527)

ABSTRACT

A graphical user interface for the monitoring and/or controlling of a computer controlled dairy farm system, or part thereof, by a human user, is disclosed, which includes a computer based graphical and schematic representation of the dairy farm system, or part thereof, where the representation includes objects, each of which represents a respective part of the dairy farm system, or part thereof, and having at least one associated physical property, wherein each of the at least one physical property associated with the respective object is included among physical properties of the respective represented part of the dairy farm system, or part thereof. Each of the at least one physical property which is included among the properties of the respective represented part of the dairy farm system, or part thereof, is preferably chosen from the group of spatial location, size, shape, color, direction, movement, amount, rate, frequency and distance from other objects.

Applicant: RUDA, Fredrik
U.S. National Phase Application of
International Application Serial No. : PCT/SE00/01674
International Filing Date: 31 August 2000
Title: GRAPHICAL USER INTERFACE
        AND METHOD RELATED THERETO

MARKED UP COPY OF PRELIMINARY AMENDMENT TO SHOW CHANGES MADE

Claims

        Please amend the claims as follows:

        1.   (Amended) A graphical user interface for [the] monitoring and/or
controlling [of] a computer controlled dairy farm system or part thereof [,] by a human user,
[characterized in that] said graphical user interface [comprises] comprising a computer based
graphical and schematic representation of said dairy farm system or part thereof, [where] wherein
said representation comprises objects, each of which represents a respective part of said dairy
farm system, or part thereof, and each having a spatial location in relation to the other object(s),
wherein said spatial location in relation to other object(s) of the respective object is mapped to
the spatial location of the respective represented part of said dairy farm system or part thereof.

        2.   (Amended) The graphical user interface as claimed in claim 1,
[characterized in that] wherein
        –   each of said objects has at least one associated physical property, wherein
                each said at least one physical property associated with the respective
                object is comprised among physical properties of the respective
                represented part of said dairy from system or part thereof; and
        –   each said at least one physical property which is comprised among the
                properties of the respective represented part of said dairy farm system or
                part thereof, is chosen from the group of size, shape, color, direction,
                movement, amount, rate, and frequency.

        3.   (Amended) The graphical user interface as claimed in claim 1 [or 2,
characterized in that] , wherein said graphical user interface comprises a schematic representation
of an entire dairy farm system, in which case said graphical user interface comprises objects
representing parts such as each individual cow, fence, gate or apparatus in the dairy farm system.

        4.   (Amended) The graphical user interface as claimed in claim 3,
[characterized in that] wherein said graphical user interface comprises schematic status
indications for at least one of said objects such as for instance if a cow has been milked or not, if
a gate is opened or closed, or if an apparatus is in use or not.

Applicant: RUDA, Fredrik
U.S. National Phase Application of
International Application Serial No. : PCT/SE00/01674
International Filing Date: 31 August 2000
Title: GRAPHICAL USER INTERFACE
AND METHOD RELATED THERETO
Page 2

5.   (Amended) The graphical user interface as claimed in claim 1 [or 2, characterized in that] , wherein said graphical user interface comprises a schematic representation of milking machine or part thereof, or of a cow or part thereof.

6.   (Amended) The graphical user interface as claim in claim 5, [characterized in that] wherein said graphical user interface comprises schematic representations of the teats of a cow, or teat cups that are attached to them, by four icons located schematically with a longer distance between the icons representing the front teats or teat cups and a shorter distance between the icons representing the back teats or teats cups.

7.   (Amended) The graphical user interface as claimed in claim 6, [characterized in that] wherein the schematic representations of the teats or teat cups are associated with respective controls for starting milking or with respective status indications indicating milk yield during milking.

8.   (Amended) The graphical user interface as claimed in claim 6, wherein [or 7, characterized in that] said graphical user interface comprises schematic representations of the teat cups as detached at spatial locations, which schematically correspond to the respective spatial locations in the milking machine[, e.g. along a line].

9.   (Amended) The graphical user interface as claimed in claim 8, [characterized in that] wherein each of the four icons schematically representing the teats of a cow, or teat cups that are attached to them, has a visual characteristic in common with the respective associated schematic representation of the teat cup as detached, [e.g. along a line,] in order to map each detached teat cup to its respective attached position.

10.   (Amended) The graphical user interface as claimed in [any of claims 5-9, characterized in that] claim 5, wherein said graphical user interface comprises schematic representations of an entry gate and of an exit gate, respectively, of said milking machine, at spatial locations corresponding schematically to the respective locations in the milking machine.

11.   (Amended) The graphical user interface as claimed in claim 10, [characterized in that] wherein the schematic representations of the entry gate and of the exit gate are associated with respective controls for opening and closing the respective gate or with respective status indications indicating whether the respective gate is opened or closed.

Applicant: RUDA, Fredrik
U.S. National Phase Application of
International Application Serial No. : PCT/SE00/01674
International Filing Date: 31 August 2000
Title: GRAPHICAL USER INTERFACE
AND METHOD RELATED THERETO
Page 3

12. (Amended) The graphical user interface as claimed in [any of claims 6-11, characterized in that] claim 6, wherein said graphical user interface comprises schematic representations of a rear plate and of a manger, respectively, of said milking machine.

13. (Amended) The graphical user interface as claimed in claim 12, [characterized in that] wherein the schematic representations of the rear plate and of the manger are associated with respective controls for positioning the rear plate and the manger or with respective status indications indicating the location of the rear plate and the manger.

14. (Amended) An automatic milking machine[, characterized in that said] comprising a graphical user interface [comprises a graphical user interface] as claimed in [any of claims 1-13] claim 1.

15. (Amended) A method for providing a graphical user interface for the monitoring and/or controlling of a computer controlled dairy farm system or part thereof, by a human user, [characterized by] comprising the step of:
    – displaying a computer based graphical and schematic representation of said dairy farm system or part thereof, where said representation comprises objects, each of which represents a respective part of said dairy farm system or part thereof, and each having a spatial location in relation to the other object(s) of the respective object is mapped to the spatial location of the respective represented part of said dairy farm system or part thereof.

17. (Amended) The method as claimed in [claims 15 or 16, characterized by] claim 15, further comprising the step of displaying a schematic representation of a milking machine or part thereof, or of a cow or part thereof.

18. (Amended) The method as claimed in claim 17, [characterized by] further comprising the step of displaying schematic representations of the teats of a cow, or teat cups that are attached to them by four icons located schematically with a longer distance between the icons representing the front teats or teat cups and a shorter distance between the icons representing the back teats or teat cups.

GRAPHICAL USER INTERFACE AND METHOD RELATED THERETO

TECHNICAL FIELD OF THE INVENTION

The present invention generally relates to dairy farming and particularly to a graphical user interface, and a method related thereto, for enabling a human user to monitor and/or control a computer controlled dairy farm activity such as for instance automated or semi-automated machine milking.

DESCRIPTION OF RELATED ART AND BACKGROUND OF THE INVENTION

In modern dairy farm industry there are continuous research ·and development activities in order to improve the efficiency of various activities such as machine milking, which, inter alia, involves increased milk yield, reduced milking time, while still maintaining good udder health. Other activities include feeding, breeding, cleaning and other treatments.

A major trend in this respect is an increased degree of automation of the various activities. For instance, machine milking may be performed by controlling milking robots, more or less manually, or it may even be performed completely automated. In both cases, at least some of monitoring, controlling, regulating, maintaining, trouble shooting, etc., of the milking machine or robot, by a user or operator of the machine, is needed whereby communication between the user and the machine is realized through an input/output means, e.g. a computer screen and a keyboard, a so-called pointing screen, or through more conventional controls such as levers and knobs, of the machine. Very few considerations in respect of designing these controls, and particularly those represented on computer screens, have been taken, which have resulted in poor, often complex, designs. Computer screens often display the information in plain text and various actions are

typically performed by pressing a number, often arbitrary chosen, followed by pressing a "return" button or the like.

A problem in this respect, particularly in relation to advanced complex monitoring and controlling associated with computer controlled communication, but also concerning simpler conventional controls, is that it might be a hazardous task for the user not to make any mistakes in the communication with the machine or when interpreting received information, which in turn may lead to fatal errors in the operation of the machine. The more complex the control means is and the shorter time the human user has available, the higher is the probability for the user to perceive information erroneously and/or perform erroneous actions.

In a dairy farm system, there are some particular concerns that have to be dealt with. Firstly, a dairy farm comprises a particular environment in that it includes living animals. In such an unpredictable or uncontrollable environment emergency situations may arise such as animals getting jammed in a gate or teats getting caught in a teat cup etc. In such circumstances, an activity such as opening a gate or detaching a teat cup is needed to be performed extremely rapidly. The user of the dairy farm system, being under stress, thus performs an action, i.e. the first action that comes to the user's mind which is intuitively believed to be the right action. The risk of faulty actions is in this respect considerable high.

Secondly, the problems are probable to arise for a user which is not familiar with the system such as a substitute or the like or for a user confronting a part of the system which normally is not used, e.g. a part used for infrequent operation and maintenance activities, or the like.

Consequently, in an automated dairy farm there is an urgent need of a graphical user interface for controlling various activities,

which is easy to understand, logical and enables a user to perform an action in an intuitive manner.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a graphical user interface in a computer controlled dairy farm system such as a machine milking facility, for monitoring and/or controlling said system. Said graphical user interface should be arranged so as to minimize the cognitive burden that the user is exposed to during use of, e.g. communication with, the system, in order to hereby minimize the risk of erroneous actions.

In this respect, it is a further object of the invention to be integratable in existing computer controlled dairy farm systems.

It is yet a further object to provide such an inventive interface for effective, accurate, precise and reliable use of said system.

These objects among others are, according to one aspect of the invention, fulfilled by a graphical user interface as claimed in Claim 1.

A further object of the present invention is to provide a method for displaying a graphical user interface in a computer controlled dairy farm system, or part thereof, for communication from the system to a human user and/or from the user to the system.

Consequently, there is according to a second aspect of the present invention provided a method as claimed in Claim 16.

An advantage of the present invention is that it provides for a reliable operation of the computer controlled dairy farm system.

Further characteristics of the invention, and advantages thereof, will be evident from the following detailed description of

embodiments of the invention, which are shown in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become more fully understood from the detailed description of embodiments of the present invention given hereinbelow and the accompanying Figs. 1-3 which are given by way of illustration only, and thus are not limitative of the invention.

Fig. 1 displays schematically a graphical user interface according to a first embodiment of the present invention.

Fig. 2 illustrates schematically a graphical user interface according to a second embodiment of the present invention.

Fig. 3 illustrates schematically a graphical user interface according to a third embodiment of the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS

In the following description, for purposes of explanation and not limitation, specific details are set fourth, such as particular hardware, applications, techniques, etc. in order to provide a thorough understanding of the present invention. However, it will be apparent to one skilled in the art that the present invention may be practiced in other embodiments that depart from these specific details. In other instances, detailed descriptions of well-known methods, protocols, apparatuses, and circuits are omitted so as not to obscure the description of the present invention with unnecessary details.

While the present invention is to be employed for communication between a human user and an arbitrary computerized dairy farm system, it will mainly be described in relation to a milking

machine system, which typically involves, for each animal milking
unit, a clawpiece and a cluster of four teat cups connected to the
clawpiece. Each teat cup has a rigid shell and an internal
flexible liner. This liner has a topmost mouthpiece and a body
part inside the shell body. The liner extends through the bottom
of the shell body as a short milk tube. This tube is connected to
clawpiece and thence, by way of a long milk tube, to a source of
steady vacuum. An annular space, between the teat cup shell and
the teat cup liner, is connected to the clawpiece by a pulse tube
and thence to a source of pulsating vacuum. A milk meter may be
attached to the downstream end of the long milk tube.

Alternatively, the clawpiece and the cluster may be dispensed
with, whereby each teat cup is connected directly to a respective
long milk tube, and each long milk tube is connected to the vacuum
source.

For milking, the four teat cups are placed around the animal's
teats, the liner mouthpiece of each teat cup being fitted over the
respective teat. The teat cups are held in position during the
milking by adhesion, due to the steady vacuum applied for the
milking. The pulsating vacuum applied between the teat cup liner
and shell causes the liner body to dilate and contract again, thus
promoting the flow of milk by simulating suckling. After
completion of the milking, the teat cup cluster is removed from
the animal's teats, either manually or by automatic means.

The present invention comprises a design of a graphical user
interface and interactions through said interface that employs the
principle of natural mapping.

Mapping is a technical term, which refers the relation between two
things; in the present case the graphical user interface and the
automated dairy farm system, e.g. the milking machine. Natural
mapping means that this relation should be natural, logic and

simple. If a correct natural mapping is employed, there is no need
for diagrams, labels or wordy instructions, see e.g. D.A. Norman
in The Psychology of Everyday Things, Basic Books, 1988.

Thus, the present invention comprises a graphical user interface
for monitoring and/or controlling of a computer controlled dairy
farm system by a human user comprising a computer based graphical
and schematic representation of said system, of a machine or part
of a machine thereof, of a fence or a gate thereof, or of an
animal, or part thereof, at the dairy farm, featuring that said
representation is employing the principle of natural mapping.

In this respect said graphical and schematic representation
comprises objects, each of which represents a respective part of
said dairy farm system, or part thereof, and each having at least
one associated physical property, wherein each said at least one
physical property associated with the respective object is
comprised among physical properties of the respective represented
part of said dairy farm system, or part thereof.

Furthermore, each said at least one physical property which is
comprised among the properties of the respective represented part
of said dairy farm system, or part thereof, is preferably chosen
from the group of spatial location, size, shape, color, direction,
movement, amount, rate, frequency and distance from other objects.

Alternatively, a relation between a first and a second object of
said representation is comprised among relations between a first
and a second part of the dairy farm system, or part thereof, which
are represented by said parts.

A few embodiments of the present invention will now be described
in relation to a milking robot installation. They constitute
different graphical user interfaces, or screen windows that all
represent the robot, part thereof or gates used for the milking

activities, and/or the cow, or part thereof, in a graphical manner
that eliminate, or at least reduce the probability of faulty
conception by the user, by the employment of natural mappings.

A first embodiment of the present invention will now be described
with reference to Fig. 1, which schematically illustrates a
graphical user interface used for e.g. monitoring or controlling
of a milking machine of the above depicted type during a
particular phase of the milking denoted "Teat attach and Milking".
Here, the four teats of the cow are represented graphically by
four boxes, labeled "Start Milking", located relative each other
as they do in reality, i.e. with a larger distance between the
front teats than between the back teats. This is a fact well known
to every single farmer, and hence the risk for making a mistake
while identifying the teats for further handling such as milking,
is minimized. When viewing the interface and the milking machine,
respectively, from the same position, the cow and the graphical
teat representation should preferably have their fronts facing
towards the same direction, i.e. towards the right in the
illustrated case. But in either case, the risk of making a mistake
is severely reduced.

Furthermore, each teat representation has a respective status
indication associated therewith, which indicates whether the teat
is being milked or not. In Fig. 1 the representations show "Start
milking" and the teats are thus not being milked. By activating
the milking manually, e.g. by pressing the "Start milking"
buttons, or whether it is performed automatically, the
representations are starting to indicate the milk mass flow in
real time. Next to each representation, there is a status
indication of the milk yield (in grams), i.e. accumulated
collected milk, from the respective teat during the milking.

The labels "left rear", "left front", "right rear" and "right
front" are redundant information and may be removed, whereby only

the naturally mapped graphical representation of the teat formation is sufficient for identifying the respective teat. This is an example of a simple but excellent natural mapping.

Considering next Fig. 2 which illustrates a graphical user interface according a second embodiment of the present invention corresponding to an adjustment phase, i.e. for teat cup testing, of the milking machine. At this stage, the teat cups are located along a line in a magazine at one side of the milking machine. The interface has graphical representations of the teat cups in this location and the coupling between the respective positions, i.e. in its magazine and attached to teat, is shown by color-coding of the respective representations. Thus, there is a mapping between the teat cup in its magazine position and in its position during milking.

Alternatively, the coupling may be indicated by arrows or movement directions for how respective teat cup is moved during teat attachment and detachment, which may be activated automatically or by the user, e.g. by clicking, double clicking or movement through the so-called drag-and-drop technique of the respective graphical representation.

Considering next Fig. 3 which illustrates a graphical user interface according a third embodiment of the present invention corresponding to an other adjustment phase of the milking machine, i.e. a stall control, for adjusting of manger position, a rear plate, and entry and exit gates, respectively.

Here, the rear plate, i.e. a plate for collecting cow excrements, may be in either of two positions; in a "Pull Back" position wherein it is out of use and removed from the stall enabling the cow to enter the stall from left, i.e. through an entry gate, or in a "Release" position wherein it is positioned behind the cow, when the cow is in the stall, for collecting of excrements. The

rear plate is moved as indicated by the arrows, i.e. to the left when it is pulled back and to the right when it is released. The position of the manger is utilized for adjustment of the stall length to each individual cow. This is performed by variably position the manger; more to the left for shorter cows and more to the right for longer cows, as indicated by the scroll bar (and the arrows in the Figure). Finally, the entry and exit gates have push buttons for opening and closing. The gates are preferably opened from the far side of the user and closed from the close side, as indicated by the positions of the respective push buttons in the Figure.

Furthermore, the respective positions of the rear plate, the manger and the gates correspond to their positions in reality, i.e. with the rear plate and the entry gate to the left and the manger and the exit gate to the right (from the user's intended viewpoint).

A fourth embodiment of the present invention (not shown in the Figures) comprises a graphical user interface that shows an entire dairy farm in a perspicuous manner, with position indications for each individual cow, fence, gate and apparatus, and status indications such as if cows have been milked or not, if gates are opened or closed, and if apparatuses are in use or not.

Other machines or processes at a dairy farm may off course be equally suited for the implementation of a computer controlled, controlling and/or informing graphical user interface that makes use of the invention by employing natural mappings.

In summary several embodiments of the present invention have been disclosed, which illustrate the various characteristics of the present invention.

It will be obvious that the invention may be varied in a plurality of ways. Such variations are not to be regarded as a departure from the scope of the invention. All such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the appended claims.

CLAIMS

1. A graphical user interface for the monitoring and/or controlling of a computer controlled dairy farm system or part thereof, by a human user, c h a r a c t e r i z e d i n that said graphical user interface comprises a computer based graphical and schematic representation of said dairy farm system or part thereof, where said representation comprises objects, each of which represents a respective part of said dairy farm system, or part thereof, and each having a spatial location in relation to the other object(s), wherein said spatial location in relation to other object(s) of the respective object is mapped to the spatial location of the respective represented part of said dairy farm system or part thereof.

2. The graphical user interface as claimed in claim 1, c h a r a c t e r i z e d i n that

- each of said objects has at least one associated physical property, wherein each said at least one physical property associated with the respective object is comprised among physical properties of the respective represented part of said dairy farm system or part thereof; and

- each said at least one physical property which is comprised among the properties of the respective represented part of said dairy farm system or part thereof, is chosen from the group of size, shape, color, direction, movement, amount, rate, and frequency.

3. The graphical user interface as claimed in claim 1 or 2, c h a r a c t e r i z e d i n that said graphical user interface comprises a schematic representation of an entire dairy farm system, in which case said graphical user interface comprises

AMENDED SHEET

objects representing parts such as each individual cow, fence, gate or apparatus in the dairy farm system.

4. The graphical user interface as claimed in claim 3, c h a r a c t e r i z e d   in that said graphical user interface comprises schematic status indications for at least one of said objects such as for instance if a cow has been milked or not, if a gate is opened or closed, or if an apparatus is in use or not.

5. The graphical user interface as claimed in claim 1 or 2, c h a r a c t e r i z e d   in that said graphical user interface comprises a schematic representation of a milking machine or part thereof, or of a cow or part thereof.

6. The graphical user interface as claimed in claim 5, c h a r a c t e r i z e d   in that said graphical user interface comprises schematic representations of the teats of a cow, or teat cups that are attached to them, by four icons located schematically with a longer distance between the icons representing the front teats or teat cups and a shorter distance between the icons representing the back teats or teat cups.

7. The graphical user interface as claimed in claim 6, c h a r a c t e r i z e d   in that the schematic representations of the teats or teat cups are associated with respective controls for start milking or with respective status indications indicating milk yield during milking.

8. The graphical user interface as claimed in claim 6 or 7, c h a r a c t e r i z e d   in that said graphical user interface comprises schematic representations of the teat cups as detached at spatial locations, which schematically correspond to the respective spatial locations in the milking machine, e.g. along a line.

AMENDED SHEET

9. The graphical user interface as claimed in claim 8, c h a r a c t e r i z e d i n that each of the four icons schematically representing the teats of a cow, or teat cups that are attached to them, has a visual characteristic in common with the respective associated schematic representation of the teat cup as detached, e.g. along a line, in order to map each detached teat cup to its respective attached position.

10. The graphical user interface as claimed in any of claims 5-9, c h a r a c t e r i z e d i n that said graphical user interface comprises schematic representations of an entry gate and of an exit gate, respectively, of said milking machine, at spatial locations corresponding schematically to the respective locations in the milking machine.

11. The graphical user interface as claimed in claim 10, c h a r a c t e r i z e d i n that the schematic representations of the entry gate and of the exit gate are associated with respective controls for opening and closing the respective gate or with respective status indications indicating whether the respective gate is opened or closed.

12. The graphical user interface as claimed in any of claims 6-11, c h a r a c t e r i z e d i n that said graphical user interface comprises schematic representations of a rear plate and of a manger, respectively, of said milking machine.

13. The graphical user interface as claimed in claim 12, c h a r a c t e r i z e d i n that the schematic representations of the rear plate and of the manger are associated with respective controls for positioning the rear plate and the manger or with respective status indications indicating the location of the rear plate and the manger.

14. An automatic milking machine, c h a r a c t e r i z e d   i n   that said graphical user interface comprises a graphical user interface as claimed in any of claims 1-13.

15. A method for providing a graphical user interface for the monitoring and/or controlling of a computer controlled dairy farm system or part thereof, by a human user, c h a r a c t e r i z e d   b y

- displaying a computer based graphical and schematic representation of said dairy farm system or part thereof, where said representation comprises objects, each of which represents a respective part of said dairy farm system or part thereof, and each having a spatial location in relation to the other object(s), wherein said spatial location in relation to other object(s) of the respective object is mapped to the spatial location of the respective represented part of said dairy farm system or part thereof.

16. The method as claimed in claim 15, wherein

- each of said objects has at least one associated physical property, wherein each said at least one physical property associated with the respective object is comprised among physical properties of the respective represented part of said dairy farm system or part thereof; and

- each said at least one physical property which is comprised among the properties of the respective represented part of said dairy farm system or part thereof, is chosen from the group of size, shape, color, direction, movement, amount, rate, and frequency.

17. The method as claimed in claims 15 or 16, c h a r a c t e r i z e d   b y displaying a schematic representation of a milking machine or part thereof, or of a cow or part thereof.

18. The method as claimed in claim 17, c h a r a c t e r i z e d b y displaying schematic representations of the teats of a cow, or teat cups that are attached to them, by four icons located schematically with a longer distance between the icons representing the front teats or teat cups and a shorter distance between the icons representing the back teats or teat cups.

AMENDED SHEET

(54) Title: GRAPHICAL USER INTERFACE AND METHOD RELATED THERETO

(57) Abstract: A graphical user interface for the monitoring and/or controlling of a computer controlled dairy farm system, or part thereof, by a human user, is disclosed, which comprises a computer based graphical and schematic representation of said dairy farm system, or part thereof, where said representation comprises objects, each of which represents a respective part of said dairy farm system, or part thereof, and each having at least one associated physical property, wherein each said at least one physical property associated with the respective object is comprised among physical properties of the respective represented part of said dairy farm system, or part thereof. Each said at least one physical property which is comprised among the properties of the respective represented part of said dairy farm system, or part thereof, is preferably chosen from the group of spatial location, size, shape, color, direction, movement, amount, rate, frequency and distance from other objects.
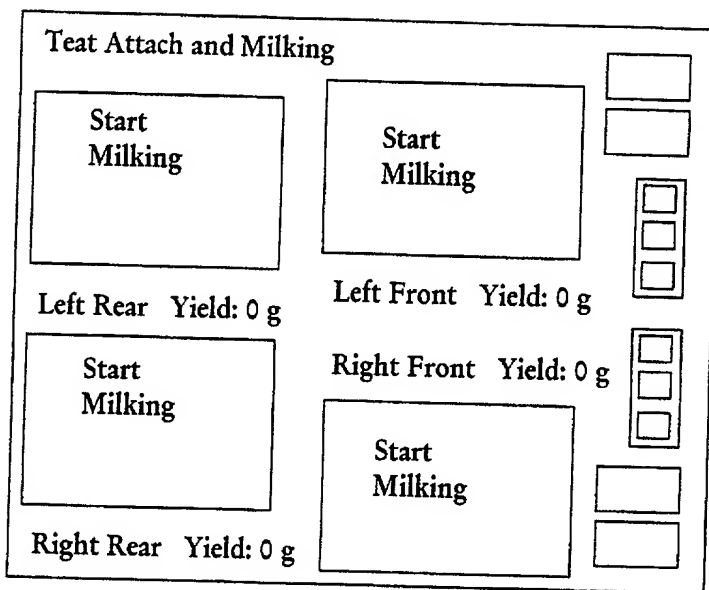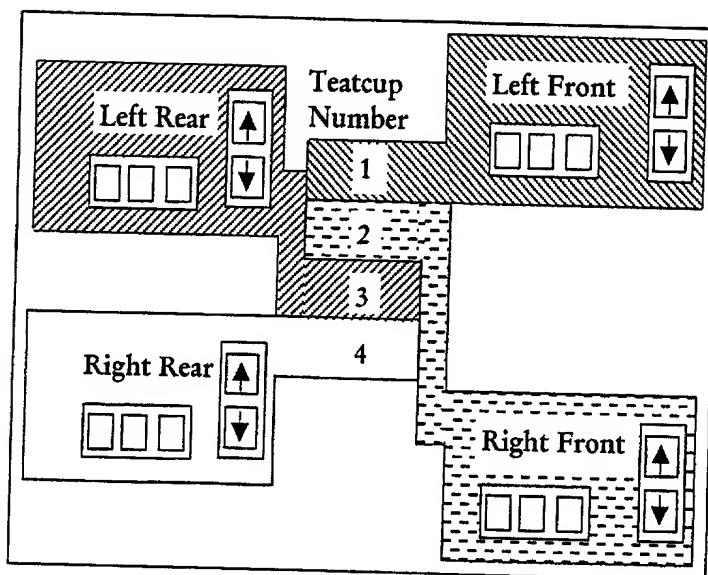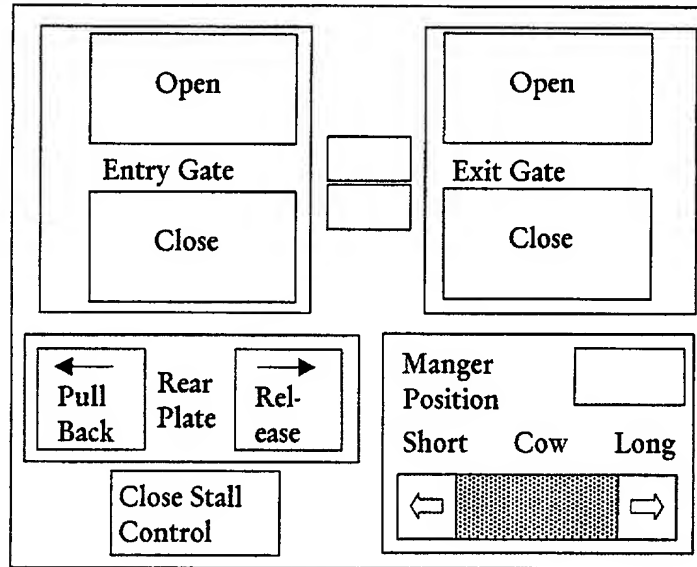
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Fig. 1

Fig. 2

2/2

Fig. 3

COMBINED DECLARATION AND POWER OF ATTORNEY (Original, Design, National Stage of PCT or CIP Application)	ATTORNEY'S DOCKET NO.

As a below named inventor I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name, I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

GRAPHICAL USER INTERFACE AND METHOD RELATED THERETO

the specification of which: (complete (a), (b) or (c) for type of application)

REGULAR OR DESIGN APPLICATION

(a) [ ] is attached hereto.

(b)   [   ]   was   filed   on   _____   as   Application   Serial   No.
_____   and was amended on _____ (if applicable).

PCT FILED APPLICATION ENTERING NATIONAL PHASE

(c) [X] was described and claimed in International Application No. PCT/SE00/01674 filed August 31, 2000 and as amended September 28, 2001

ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56(a).

[ ] In compliance with this duty there is attached an information disclosure statement. 37 CFR 1.97.

PRIORITY CLAIM

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

(complete (d) or (e))

(d) [   ] no such applications have been filed.

(e) [x] such applications have been filed as follows

EARLIEST FOREIGN APPLICATION(S), IF ANY FILED WITHIN 12 MONTHS PRIOR TO SAID APPLICATION

Country	Application No.	Date of Filing	Date of Issue	Priority Claimed
Sweden	9903112-2	September 3, 1999		☒ YES ☐ NO
				☐ YES ☐ NO
				☐ YES ☐ NO

ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS PRIOR TO SAID APPLICATION

PROVISIONAL

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States application(s) listed below:

Application Serial No.   Filing Date   Status (patented, pending, abandoned)

CONTINUATION-IN-PART
(Complete This Part Only If This Is A Continuation-In-Part Application)

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56(a), which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application:

Application Serial No.   Filing Date   Status (patented, pending, abandoned)

POWER OF ATTORNEY

As a named inventor, I hereby appoint the following attorney(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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100

Page 2